NETWORK BASED WORK SHIFT MANAGEMENT SYSTEM, SOFTWARE AND METHOD

FIELD OF THE INVENTION

[0001] The present invention relates to managing work schedules, and
5 more particularly to methods and devices for managing and allocating work
shifts.

BACKGROUND OF THE INVENTION

[0002] Most industries require members of their work force to agree to
work specified hours. Often, a group of required working hours in one day are
10 referred to as a work shift. In order to produce products or deliver services for
most of each day, sufficient workers are often employed in order to fill shifts
throughout the day.

[0003] Workers, on the other hand, often require flexibility in arranging
their work schedules and their personal lives. As such, it is not uncommon for
15 workers to have a desire to re-arrange their work schedules. Often, this is
done by taking vacation or personal leave. Informally, many organizations
additionally allow workers to exchange their responsibilities with others,
thereby allowing the workers to fill in for others, or let others fill in for them.

[0004] As such, advertisements for shifts to be filled are often found on a
20 bulletin board in a lunch room or other common gathering area. Workers
wanting to avoid work on a given day and a given time advertise this desire by
posting a paper slip. Workers willing to fill an advertised shift, typically in
return for pay, or return for work at a different time, contact the advertisers.

[0005] This practice, however, is all too informal. Advertising workers only
25 have access to workers that use the same cafeteria/gathering area;
employers are uncertain of who will take particular shifts; employers have
limited safeguards to assure that substitute workers are appropriate or have
required skills.

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[0006] Accordingly, an improved method and system allowing workers to trade and sell work shifts are desirable.

SUMMARY OF THE INVENTION:

5 **[0007]** It is therefore an object of the present invention to provide a computerized work management system, allowing employees to trade shifts.

[0008] Advantageously, employees may make their shift available to all other qualified employees within an organization. Employers have the ability to track shift trades, and ensure that only qualified employees are allowed to 10 assume an available shift.

[0009] In accordance with an aspect of the present invention, there is provided a computer implemented method of facilitating work allocation among employees within an organization. The method includes presenting a work schedule to a first one of the employees, including indicators of work 15 shifts assigned to that employee; receiving input from that employee, an indicator of a desire to make a particular one of his/her work shifts available to other employees within the organization; presenting indicators of availability of this work shift to other employees within the organization having sufficient ability to substitute for the first employee; and receiving from one of the other 20 employees an offer to assume this work shift.

[0010] In accordance with another aspect of the present invention there is provided a computer readable medium storing computer software for a work management system, that when loaded at computer server in communication with a data network, adapts the server to present a work schedule to a first 25 employee, including indicators of work shifts assigned to the first employee; receive input from the first employee, indicative of a desire to make a particular one of his/her works shifts available to other employees within the organization; present indicators of availability of the particular one of the work shifts to other employees within the organization having sufficient ability to substitute for the first employee; receive from at least one of the other

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employees an offer to assume this work shift.

[0011]   In accordance with yet another aspect of the present invention there is provided a work management system, located within the premises of an organization. The system includes a computer data network; a computer server in communication with the data network; a plurality of kiosks in communication with the data network. The server hosts a database storing employee work schedules. The kiosks are in communication with the server. The server is operable to allow an employee to post shifts for trade from one of the kiosks, and receive bids from other employees to assume posted shifts by way of the kiosks.

[0012]   Other aspects and features of the present invention will become apparent to those of ordinary skill in the art, upon review of the following description of specific embodiments of the invention in conjunction with the accompanying figures.

BRIEF DESCRIPTION OF THE DRAWING

[0013]   In figures, which illustrate by way of example, embodiments of the present invention:

[0014]   FIG. 1 illustrates a computerized work management system, including a plurality of kiosks, in communication with a network server, exemplary of an embodiment of the present invention;

[0015]   FIG. 2 is a functional block diagram of software stored and executing at the network server of FIG. 1;

[0016]   FIG. 3 is a diagram illustrating a database schema for a database used by the network server of FIG. 1;

[0017]   FIGS. 4-6 illustrates exemplary steps performed at the server of FIG. 1; and

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[0018] **FIG. 7-10** illustrate screens presented to employees by the server of **FIG. 1** at kiosks of **FIG. 1**.

DETAILED DESCRIPTION

5   **[0019]** **FIG. 1** illustrates a computerized work management system **10**, exemplary of an embodiment of the present invention. As will become apparent, work management system **10** is preferably installed at the premises of an organization that employs employees that work in shifts. As used herein, the terms "employ" and "employee" are intended to extend to
10   contractors, and others engaged on behalf of an organization or other person. The term "employer" is similarly intended to extend to any person or organization engaging employees. Shift, as used herein, is intended to refer to one or more block or blocks of time to be worked.

  [0020] System **10** may, for example, be installed at a manufacturing
15   facility, in an office, in a retail outlet, or the like. System **10** maintains work schedules of employees, and allows employees to monitor and potentially change their schedules. Supervisors/management of the employer may use system **10** to monitor employee work schedules, and collect information used in work scheduling, payroll, and other matters. Optionally, system **10** may be
20   used by employees and supervisors/management to exchange workplace related electronic messages. Advantageously system **10** allows employees to trade work shifts in manners exemplary of an embodiment of the present invention.

  [0021] Exemplary system **10** includes a computer network **12** in
25   communication with user kiosks **14** and a computer server **16**, exemplary of an embodiment of the present invention. Network **12** is preferably a private local area packet switched data network coupled to server **16**. Network **12** may, for example, be an internet protocol, X.25, IPX compliant or similar network. Example user kiosks **14a, 14b** and **14c** (collectively and individually
30   kiosk **14**) are also illustrated. As will become apparent, kiosks **14** are adapted

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to communicate with server **16** in manners exemplary of the present invention. Optionally, network **12** may be in communication with the public internet. If so, any conventional computing device in communication with the internet may be able to communicate with network server **16** in manners exemplary of the present invention.

[0022]   Example server **16** preferably includes a network interface physically connecting server **16** to data network **12**, and a processor coupled to conventional computer memory. Example server **16** may further include input and output peripherals such as a keyboard, display and mouse. As well, server **16** may include a peripheral usable to load software exemplary of the present invention into its memory for execution from a software readable medium, such as medium **18**.

[0023]   As such, server **16** includes a conventional filesystem, preferably controlled and administered by the operating system governing overall operation of database server **16**. This filesystem preferably hosts an employee database **30**, hypertext transfer protocol ("http") files; and software exemplary of an embodiment of the present invention, as detailed below. Server **16** provides information contained in this employee database **30** to requesting computing devices.

[0024]   **FIG. 2** illustrates a functional block diagram of software components preferably implemented at server **16**. As will be appreciated, software components embodying such functional blocks may be loaded from medium **18** (**FIG. 1**) and stored within persistent memory at server **16**. As illustrated, software components preferably include an operating system software **20**; a database engine **22**; an http server application **24**; and integration software **26**, exemplary of embodiments of the present invention. Further, database **30** is again illustrated. As well data files **28** used by integration software **26** and http server application **24** are illustrated.

[0025]   Operating system software **20** may, for example, be Linux operating system software; Microsoft NT operating system software, or the like. Operating system software **20** preferably also includes a TCP/IP stack,

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allowing communication of server **16** with data network **12**. Database engine **22** may be a conventional relational or object oriented database engine, such as Microsoft SQL Server, Oracle, DB2, Sybase, Pervasive or any other database engine known to those of ordinary skill in the art. Database engine

5   **22** thus typically includes an interface for interaction with operating system software **20**, and other application software, such as integration software component **26**. Ultimately, database engine **22** is used to add, delete and modify records at database **30**. Http server application **24** is preferably an Apache, Cold Fusion, Netscape or similar web server, also in communication

10 with operating system **20** and database engine **22**. Http server application **24** allows server **16** to act as a conventional http server, and thus provide a plurality of http pages for access by network interconnected computing devices. Http pages that make up these home pages may be implemented using one of the conventional web page languages such as hypertext mark-up

15 language ("HTML"), Java, javascript or the like. These pages may be stored within files **28**.

[0026]   Integration software **26** adapts server **16**, in combination with database engine **22** and operating system **20**, and http server application **24** to function in manners exemplary of embodiments of the present invention.

20 Integration software **26** may act as an interface between database engine **22** and http server application **24** and may process requests made by interconnected computing devices.   In this way, integration software **26** may query, and update entries of database **30** in response to requests received over network **10**, in response to interaction with presented web pages.

25 Similarly, integration software **26** may process the results of employee input and database queries, and present results to database **30**, or to employees by way of http pages. Integration software **26** may for example, be suitable CGI or Perl scripts; Java; Microsoft Visual Basic application, C/C++ applications; or similar applications created in a conventional ways by those of ordinary skill

30 in the art.

[0027]   Http pages provided to computing devices in communication with system **16** typically provide users at kiosks **14** with access to and information

about work schedules, employment information, announcements and the like. Information may be stored as HTML or similar files **28**. Conveniently, employees may make selections and provide information by clicking on icons and hyperlinks, and by entering data into information fields of the pages,

5   presented at kiosk **14**. As such, http pages are typically designed and programmed by or on behalf of the employer. Conveniently, the http pages may be varied as required by the employer.

[0028]   Server **16** further preferably stores and executes an electronic mail server or similar application (not illustrated) that may be accessed through an

10   HTML interface provided by http server application **24**. For example, a simple mail transfer protocol ("SMTP") compliant server application may be stored and executed at server **16**. Alternatively, integration software **26** may include a messaging component that may allow employees to exchange electronic mail messages. So equipped, server **16** may additionally provide e-mail

15   accounts for employee users of server **16**. Suitable files storing messages that are sent, received, deleted, and archived may be formed on the file system of server **16**. As will become apparent this server side e-mail application may be suitably integrated into system **10** by integration software **26**.

20   **[0029]**   As noted, server **16** is adapted to manage work scheduling, work allocation, and employee/employer interaction within an organization. Specifically, database **30** may store work schedules for each employee of the organization. Using these schedules, the managers or supervisors may review work allocation and track employees. Employees, on the other hand,

25   may view their work schedules and re-arrange these using kiosks **14** in manners exemplary of embodiments of the present invention. Employers and employees may additionally similarly exchange electronic messages in known ways. Http server application **24** and integration software **26** allow access to database **30** remotely over network **12** using a conventional web browser and

30   conventional web pages presented by server **16**.

[0030]   The architecture of kiosks **14** (**FIG.1**) is not specifically illustrated. Each of kiosks **14** (**FIG.1**), however, may be any suitable network aware

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computing device in communication with data network **12** and capable of executing a suitable HTML browser or similar interface. Most preferably, kiosk **14** is a conventional desktop computer including a processor, network interface, display, and memory. Preferably kiosks **14** are suitably encased, so

5 that they may be installed in locations generally accessible by employees of an organization. Exemplary kiosks **14** are intended for occasional use by employees to obtain and exchange work related information. Kiosks **14**, could, of course, be replaced by desktop computing devices provided at employee workstations.

10 **[0031]** Kiosks **14** may access server **16** by way of data network **12**. As such, kiosks **14** typically stores and execute network aware operating systems including protocol stacks, such as TCP/IP stack, and internet web browsers such as Microsoft Internet Explorer™, Mozilla™, Netscape™, or Opera™ browsers. In order to limit use of kiosks **14**, as intended by an employer,

15 conventional software may be modified so that many of its conventional features are disabled.

[0032] As noted, server **16** includes a database **30**. Database **30** is preferably a relational database. As will become apparent, database **30** includes records for a plurality of employees served by server **16**. A

20 simplified example organization of database **30** is illustrated in **FIG. 3**. As illustrated, database **30** is organized as a plurality of tables. Specifically database **30** includes user table **32** (USER), employee table **34** (EMPLOYEE); employee schedule table **36** (EMPLOYEE_SCHEDULE); employee job table **38** (EMPLOYEE_JOB); organization job table **40** (JOB);

25 employee default labour table **42** (EMP_DEF_LAB); shift trade offer table **44** (SHIFT_TRADE_OFFER); shift trade posting table **46** (SHIFT_TRADE_POSTING); shift trade type table **48** (SHIFT_TRADE_TYPE); shift trade status table **50** (SHIFT TRADE STATUS); employee role table **52** (EMPLOYEE_ROLE); and organization role table **54**

30 (ROLE).

[0033] As noted, the illustrated structure of database **30** is simplified. Depending on the nature of additional features of system **10**, that are not

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detailed herein, database **30** may include many more tables. Similarly, each illustrated table may include many more columns (or fields) than those detailed herein.

[0034]   As illustrated, user table **32** includes columns (and therefore fields) for storing data representative of a user identifier (USER_ID); user name (USER_NAME); employee identifier (EMP_ID); and a user e-mail address (USER_E-MAIL). User table **32** stores records of users of system **10**.

[0035]   Employee table **34** includes columns (and therefore fields) for storing data representative of employee identifier (EMP_ID); employee name (EMP_NAME); employee last name (EMP_LASTNAME); and employee first name (EMP_FIRST_NAME). Employee table **34** stores records of users of system **10** that are employees.

[0036]   Employee schedule table **36** includes columns associated with an employee's work schedule for storing data associated with an employee's work schedule. Fields include an employee schedule identifier (EMPSKD_ID); an employee identifier (EMP_ID); work date (WORK_DATE); an employee schedule shift identifier (EMPSKD_ACT_SHIFT_ID); an employee schedule start time (EMPSKD_ACT_START_TIME); an employee schedule end time (EMPSKD_ACT_END_TIME). Employee schedule table **36** stores work schedules of employees identified in table **34**.

[0037]   Employee job table **38** includes an employee job identifier field (EMPJOB_ID); an employee identifier (EMP_ID); and a job identifier field (JOB_ID). Employee job table **38** stores information about jobs that employees identified in table **34** may fill.

[0038]   Job table **40** includes a job identifier field (JOB_ID); a job name field (JOB_NAME); and a job description field (JOB_DESC). Job table **40** stores details about jobs within an organization.

[0039]   Employee default labour table **42** includes columns representing an employee labour allocation identifier (EDLA_ID); an employee identifier (EMP_ID); and a job identifier (JOB_ID). Employee default labour table **42**

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stores information about the current job allocation of employees in employee table **34** to jobs in table **40**.

[0040]   Shift trade posting table **46** includes columns representing a shift trade posting identifier (STRADPOST_ID); and employee identifier (EMP_ID);
5   work date (WORK_DATE); job identifier (JOB_ID); a shift start time (SHIFT_START_TIME); a shift end time (SHIFT_END_TIME); a shift trade type identifier (STRADTYPE_ID); shift trade status identifier (STRADSTATUS_ID); post date (POST_DATE); status date (STATUS_DATE); and comments (COMMENTS). Shift trade posting table **46**
10   details shifts offered for trade.

[0041]   Shift trade offer table **44** includes columns representing a shift trade offer identifier (STRADOFFER_ID); a shift trade post identifier (STRADPOST_ID); an employee identifier (EMP_ID); a job identifier (JOB_ID); a work date field (WORK_DATE); a shift start time
15   (SHIFT_START_TIME); a shift end time (SHIFT_END_TIME); an offer date (OFFER_DATE); an offer accepted indicator (OFFER_ACCEPTED); and comments (COMMENTS). Shift trade offer table **44** details offers for posted shifts in table **46**.

[0042]   Shift trade type table **48** includes a shift trade type identifier
20   (STRADTYPE_ID), a shift trade type name (STRADTYPE_NAME) and a shift trade type description (STRADTYPE_DESC). Shift trade type table **48** stores information about the nature of shift trades, and specifically if a shift has been traded in return for another shift (i.e. a shift swap), or if an extra shift has been assumed by an employee as a result of a trade.

25   **[0043]**   Shift trade status table **50** includes a shift trade status identifier (STRADSTATUS_ID); and a shift trade status name (STRADSTATUS_NAME); and a shift trade status description (STRADSTATUS_DESC). Shift trade status table **50** stores information about the status of posted shift trades, and may indicate whether a trade is pending
30   or has been approved.

[0044] Employee role table **54** includes an employee role identifier (EMPROLE_ID); an employee identifier (EMP_ID); a role identifier (ROLE_ID); a supervising employee identifier (REF_EMP_ID). Employee role table **54** stores information about an employee's current role (e.g. manager, worker, etc.) within an organization, as well an employee's supervisor.

[0045] Role table **52** includes a role identifier (ROLE_ID); a role name (ROLE_NAME); a role description (ROL_DESC). Role table **52** stores information about available roles within the organization.

[0046] Now, each user of system **10** is assigned a user identifier. A corresponding record within table **32** is created for the user, including this user identifier, and the user's true name. If the user is an employee, a unique employee identifier is assigned, and stored within the EMP_ID field of the user record in table **32**. This unique identifier is used to identify associated records within the remaining tables of database **30**. A corresponding employee record for this user/employee is created in the employee table **34**. This record is further populated with the employee's name. As will be appreciated, database **30** may be updated by an employer each time a user/employee joins or leaves an organization, or when there is a change in circumstances.

[0047] Depending on the employee's skills, one or more records within the employee job table **38** are created for each employee. Each record identifies a particular job within the organization that an identified employee may be filled. The employee is identified by EMP_ID, and the job is identified in the JOB_ID field. The EMP_ID corresponds to the employee identifier in employee table **34**. The JOB_ID corresponds to a job within the organization detailed in job table **40**. Depending on the nature of the employee's skills several records within table **38** may be created. As an employee's skills improve over time, records identifying the employee and his or her acquired skills may be added to employee job table **38**.

[0048] Job table **40** identifies classified jobs within an organization. Table **40** may identify the job by name and description.

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[0049] Employee schedule table **36** contains records corresponding to an employee's schedule for each day. Each record within table **36** corresponds to one employee's work schedule for one day. Again, the employee is identified by an employee identifier in the EMP_ID field. This corresponds to
5   an employee for whom a record exists within employee table **34**. Start and stop times are further included within the record.

[0050] An employee's current job assignment (i.e. an identifier of the employee's current job among possible jobs) within the organization is identified by a record within table **42**. Again, the employee is identified within
10   the record by his or her unique employee identifier. The job is identified in the record, and corresponds to a job within the organization.

[0051] An employee's role as supervisor or subordinate is additionally stored within a record of employee role table **54**. The employee's immediate supervisor is identified by the REF_EMP_ID field within role table **52**. The
15   supervisor is preferably identified by his or her employee id. A corresponding record for the supervisor exists within table **34**. Available roles within the organization are stored within table **52**.

[0052] So, the combination of entries within tables **32, 34, 36, 38, 40, 42** uniquely define an employee's work schedule within an organization. Queries
20   of these tables for a particular employee identifier will identify an employee's job skills; and work schedule (including assigned shifts). The employee's role and supervisor within the organization are detailed in records within tables **52** and **54**.

[0053] Database **30** may be updated as required by an employer. It may
25   be updated manually, or by suitable scripting software, not detailed herein that may optimize or otherwise allocate shifts and the like.

[0054] As will become apparent, employee shifts available for trade are recorded within table **46**. Bids to assume these shifts are recorded within table **44**.

30   **[0055]** In operation, an employee may use any one of kiosks **14 (FIG. 1)** to

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view information about the employee's work profile. To do so, the employee may use a web browser at the kiosk **14**, to establish a session with server **16**. Example steps taken at server **16** in response to interaction with an employee at one of kiosks **14** are detailed in **FIGS. 4-6**. Example screens presented to the employee are illustrated in **FIGS. 7-10**. Specifically, upon initial contact by an employee, http server application **24** at server **16** provides the browser software at kiosk **14** with a log-in prompt by providing a suitable HTML form stored within files **28** at server **16**. This form allows the employee to identify and/or authenticate himself or herself in step **S402**.

[0056]   Once authenticated, server **16** is aware of the employee's unique id, as stored within database **30**. Server **16** under control of integration software **26** and using the employee id checks for new messages directed to the particular employee in step **S404**. For example, integration software **26** may query the e-mail server application hosted at server **16** to determine if any new messages have arrived for the logged-in employee. If so, the employee may be suitably notified by being presented with an HTML page, or the like in step **S406**.

[0057]   Next, in step **S408**, server **16** uses the identification of the employee to query if any shifts suitable to the employee have been made available for trading, or "posted". Specifically, table **46** may be queried for entries having job identifiers corresponding to those associated with the logged-in employee. As noted, appropriate jobs for the employee are stored within employee job table **38**. If matches exist, as determined in step **S410**, the employee is notified of the posted shifts in step **S412**. The employee may be presented with a prompt or HTML page identifying the available shifts. As will become apparent, the employee is given the option of viewing available posted shifts and bidding on these in steps **S600** and onwards, as also detailed below.

[0058]   Further, in steps **S414** and onward, the employee is presented with a main menu presenting the employee with a variety of options. The employee may, for example, originate e-mail messages to others within the organization; view facilities information, including for example, a map, hours of

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operation and the like. These features are not detailed herein.

[0059]   More significantly, the employee may view his/her work schedule by pressing a suitable HTML link on a presented screen in step **S414**. This request is provided to server **16**, which in turn under control of integration software **26** generates a suitable query to database **30** using engine **22**, and forms an HTML page presenting a main menu and the employee's work schedule on screen **700**, as illustrated in **FIG. 7**. As illustrated, the main menu is formed as frame **702** within a presented window. Conveniently, this frame may be present for all presented screens.

[0060]   The query may query table **36** for the employee's daily schedule for dates of interest. This HTML page is presented to the user at kiosk **14**. Specifically, http server application **24** provides the HTML data for presentation by the web browser at kiosk **14**. Optionally, the employee may view his/her schedule as a calendar.

[0061]   Now, in manners exemplary of the present invention, the employee may also choose to make one or more of his work shifts available to other employees in step **S416**. A shift that is to be made available to others is said to be "posted". This may be effected by clicking an appropriate link from the main menu screen, or from screen **700** (**FIG. 7**). Thereafter steps **S500** illustrated in **FIG. 5** are performed.

[0062]   Specifically, in step **S502** the employee is presented with a suitable screen **800**, as illustrated in **FIG. 8**, that the employee may use to identify and confirm the shift that he/she wishes to post. He or she may do so by either by entering text data identifying the shift, or by clicking on the shift as presented on an HTML screen. If confirmed in step **S504**, server **16** is provided with an indicator that the particular shift is to be posted for trade in step **S506**. In response, in step **S508**, software **26** at server **16** generates a record (entry) in the SHIFT_TRADE_POSTING table **46** of database **30**, indicative of the posted shift. Fields identifying the employee (EMP_ID); date of the posted shift (WORK_DATE); job type (JOB_ID); shift identifier (SHIFT_ID); shift start and end time (SHIFT_START_TIME; SHIFT_END_TIME); post date

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(POST_DATE); and status date (STATUS_DATE) are populated with appropriate information about the posted shift and employee, in response to receiving the indicator in step **S508**. The appropriate information may be received input by the employee, or parsed from user interaction with the employee's presented schedule. As well, a record within shift trade status table **50** may be created indicating that the shift trade is pending and has not been completed.

[0063] Optionally, server **16** may prevent postings of shifts that are too close in time, or in the too distant future. For example, server **16** may prevent posting of shifts that will occur within 48 hours. Similarly, integration software **26** may limit posting of shifts based on employer defined rules. For example, an employer may prevent posting of shifts on identified days.

[0064] After posting of a shift is complete, server **16** again performs steps **S414** (**FIG. 4**), and onward.

[0065] In addition to posting shifts, an employee may view posted shifts of others. Specifically, as noted, in step **S406-S412**, upon log-in server **16** may present to a user at one of kiosk **14** an indicator that work shifts are available for bidding. Server **16** does this by first querying employee job table **38** of database **30** for posted jobs of the type JOB_ID of the job types associated with the logged in employee. That is, database **30** is queried for entries within SHIFT_TRADE_POSTING table **46**, having job identifiers (JOB_ID) corresponding to that of the logged in employee. As each employee may have many associated job types, such a query should return all posted jobs that may be assumed by the logged-in employee.

[0066] Entries within SHIFT_TRADE_POSTING table **46** matching the query, if any, may be retrieved, an indicator of the matches may be presented to the employee in step **S410**. The actual matches could also be presented to the logged-in employee for consideration, at this time. In the preferred embodiment, however, the matches are presented in steps **S600**, upon selecting an appropriate link in step **S414**. Optionally, the query performed in step **S408** could be performed at this time. Again, matches may be presented

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to the employee at kiosk **16** as a suitable HTML form in step **S602** generated
by HTTP server application **24** in cooperation with database engine **22**, and
integration software **26**. Alternatively, the retrieved shifts may be presented in
an separate window, for browsing by the employee. So presented, the
5   employee may browse posted shifts. An example screen **900** presenting
posted shifts available for bidding by an employee is illustrated in **FIG. 9**.

[0067]   Once presented with suitable matches, the employee may bid on a
particular posted shift, by clicking on an identifier of the shift. This desire to
bid on a shift and an indicator of the shift is presented to server **16** in step
10   **S604**. In order to bid, the employee may be presented with an appropriate
HTML screen **900** to be populated in step **S606**. Again, the form may be
presented by http server application **24**, in cooperation with database engine
22, and integration software **26**. The employee may populate the form by
indicating acceptance of the offered shift on the terms set by the offering
15   employee, or by presenting a counter-offer. For example, the employee may
offer to take the posted shift, if the posting employee agrees to assume
another shift. Counter-offers may be presented implicitly. A bidding employee
wishing to assume one shift may by implication require the posting employee
to assume the bidding employee's shift on the day of the posted shift. As
20   such, if the bidding employee accepts such an offer, the shift trade will result
in an exchange or swap of shifts. In any event, once populated, the data in
the form is returned to server **16**, in step **S608**.

[0068]   Optionally, server **16** may query the bidding employee's work
schedule (steps not illustrated) by querying table **36** to ensure no conflict
25   between the bidding employee's work schedule and the bid-upon shift. If a
conflict exists, the bidding employee may be notified, and the bid need not be
recorded. Again an employer may set rules permitting or allowing certain
bids. For example, a bidding employee may be prevented from assuming
more than one shift in a day, or a set number in a week or other interval.

30   **[0069]**   If a bid is to be recorded, a record within SHIFT_TRADE_OFFER
table **40** of database **30** is generated and populated with an identifier of the
bid-upon shift and date (STRADPOST_ID field), as well as an identifier of the

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bidding employee (EMP_ID field) in step **S610**. An offer of acceptance may
be noted in the OFFER_ACCEPTED field of the record of the posted shift in
shift trade posting table **46**. Additionally, a message notifying the posting
employee of the bid/counter-offer/offer of acceptance is generated. Server **16**
5   may do this by generating a notification e-mail message reflecting the
offer/counter-offer to accept a posted bid using entries within shift trade offer
table **44**, also in step **S610**.

[0070]   Upon completion of a bid, the employee may continue to browse
posted shifts. Step **S602** and onward are repeated. Once an employee no
10   longer wishes to bid, as determined in step **S604**, he or she may exit from the
bidding screen as determined in step **S612** and be returned to the main
screen presented in step **S414 (FIG. 4)**.

[0071]   Upon future log-in by the posting employee, server **16** notifies the
employee if any shifts previously posted by the now logged-in posting
15   employee have been bid upon. This may be effected, by database engine **22**
querying table **46** for bids posted by the posting employee, having been bid
upon. A notification e-mail may, for example, be presented to the posting
employee in step **S404**. The e-mail may further contain a link to an HTML
screen **1000** allowing the posting employee to accept the bid, as illustrated in
20   **FIG. 10**. Conveniently, if multiple bids are presented, the posting employee
will be notified of each of the offers and may choose the most attractive bid.

[0072]   Now, once a posted shift has been bid upon, and the bid has been
accepted, the potential shift trade is preferably presented to a supervisor for
authorization. Specifically, software **26** queries table **54** for supervisors of the
25   posting and offering employee. E-mails identifying the potential shift may be
forwarded to the supervisors so identified. These supervisors may be
presented with HTML forms requiring approval of the shift trade (not shown).
Once the shift trade is approved the associated shift trade status record within
table **50** may be updated. If the potential shift trade is not approved, the
30   posting and bidding employees may be notified, again preferably by e-mail.

[0073]   Advantageously, if the initial potential shift trade is not approved,

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the posting employee may then accept any other outstanding bids. Once a shift trade is authorized, the work schedules of the posting employee and the successful offering employee are updated to reflect the traded shift. That is table **36** may be updated for both the posting and offering employee. As well,
5   the shift trade type may be recorded in table **48**. That is, whether the shift trade involves a swap of shifts or simply an assignment may be recorded.

[0074]   Optionally, prior to presentation of a potential shift trade to a supervisor, software at server **16** may analyze the bidding employee's work record to ensure that no traded shifts have been missed; to determine if a
10   posting employee has exceeded a maximum amount of work in a given interval (e.g. in a day, week or month); or to make other assessments of the offering employee. A supervisor, prior to being requested to approve a shift trade may be presented with relevant information so that this may be factored into a decision of whether or not to approve the shift trade.

15   **[0075]**   Upon next log-in by the posting employee or the bidding employee, server **16** notifies the employees of the changed schedule. Again, this may be effected as a result of software **26** generating e-mail messages to be sent to the posting and bidding employees. In order to ensure that responsibility for the posted shift is properly assigned, software **26** may wait until the
20   bidding employee has been notified before re-assigning the shift and notifying the posting employee. As well, the employees' schedules, when viewed, would reflect the traded shift.

[0076]   Advantageously, server **16** presents posted shifts to other employees only if those employees have the job skills required for the posted
25   shift (as for example determined in step **S408**). Similarly, server **16** makes posted shifts available to all employees within an organization capable of filling the shift. Further, any shift postings and offers of acceptance may be logged by server **16**. As such, shift postings, offers and trades may be analyzed by server **16**. Moreover, as any shift trade is preferably authorized
30   by one or more supervisors, shift trades may be monitored by management or by supervisors. In this way, potentially problematic shift trades may be manually denied by supervisors. Finally, as traded shifts are logged by

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system **10**, and work schedules are updated, responsibility for a missed shift may be effectively transferred to an employee who has successfully bid on a shift. Thus, if the successful bidding employee misses the shift, he or she may be held accountable. Personnel records could be updated, and future

5 shift trading privileges could be limited. As well, organization payroll records may be updated to reflect that shifts have been traded.

[0077]   As will be appreciated, while the organization of software functional blocks, database structure, screens and http/HTML pages, and servers have been illustrated as clearly delineated, a person skilled in the art will appreciate

10 that the delineation between software blocks and screens, as well as the organization of hardware embodying the invention is somewhat arbitrary. Numerous other arrangements of hardware, screens and software blocks are possible. For example, server **16** could be replaced with a plurality of servers in communication with each other: one server could host a database; another

15 http server; and yet another an e-mail application. Database **30** could be replaced by an object-oriented database.

[0078]   Of course, the described embodiments are intended to be illustrative only, and in no way limiting. These embodiments are susceptible to many modifications of form, arrangement of parts, and details and order of

20 operation. The invention, rather, is intended to encompass modifications within its scope as defined by the claims.